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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/676,921	10/01/2003	David E. Lowell	200208635-1	8290

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EXAMINER

ZHE, MENG YAO

ART UNIT	PAPER NUMBER
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2195

MAIL DATE	DELIVERY MODE
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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/676,921

Applicant(s)

LOWELL ET AL.

Examiner

MengYao Zhe

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 August 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-45 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-45 are presented for examination.

Claim Objections

2. Claims 1-19, 29-45 are objected to because of the following informalities:
 - i) Claim 1, it is unclear if "a first hardware partition" of line 4 and "a second hardware partition" of line 5 belong to "hardware" of line 1.
Line 1, please insert "(VMM)" after the phrase "a virtual machine monitor".
 - ii) Claim 6, it is uncertain how making "addresses of interest trap to the VMM" is related to claim 1 <i.e. what is the addresses of interest? Are they the addresses of hardware that belongs to the second OS instance, which the first OS instance is not suppose to access?>.
 - iii) Claim 14, it is uncertain what is meant by "resource discovery of a booting operating system" <i.e. does resource discovery refer to when the VMM is assigning hardware partition to the booting operating system?>.
Furthermore, it is unclear as to how "misinforming" is performed <i.e. does the VMM give a wrong hardware address for the booting OS instance by misinforming? Or does it send it a signal telling the OS instance that the hardware does not exist>

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1 to 45 are rejected under 35 U.S.C 102(b) as being anticipated by Bean et al, Patent No. 4,843,541 (hereafter Bean).

5. Bean et al. was cited in the last office action.

6. As per claims 1, 20, 29, 30, 38, Bean teaches in a computer including hardware, a virtual machine monitor, and first and second operating system instances, a method comprising:

using the virtual machine monitor to expose the first operating system instance to a first hardware partition and prevent the first operating system instance from discovering a second hardware partition; (Column 7, lines 55-Column 8, line 20; Column 15, lines 43-54)

using the virtual machine monitor to expose the second operating system instance to the second hardware partition and prevent the second operating

system instance from discovering the first hardware partition; (Column 7, lines 55-Column 8, line 20; Column 15, lines 43-54)

using the virtual machine monitor to share at least some of the hardware among the first and second operating system instances. (Column 8, lines 12-15)

7. As per claim 2, Bean teaches wherein the first and second partitions include different portions of memory. (Column 7, lines 55-Column 8, lines 20)

8. As per claim 3, Bean teaches wherein the first and second partitions include different I/O devices. (Column 7, lines 55-Column 8, lines 20, Column 8, lines 40-45)

9. As per claim 4, Bean teaches the method of claim 1, wherein the shared hardware includes a CPU. (Column 8, lines 59-65)

10. As per claim 5, Bean teaches wherein the virtual machine monitor allows the first instance to have direct control over the first partition, and the second instance to have direct control over the second partition. (Column 8, lines 15-25)

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11. As per claim 6, 21, 31, 39, Bean teaches wherein the virtual machine monitor configures the hardware so accesses to addresses of interest trap to the VMM; and wherein the first and second instances are booted on the virtual machine monitor after the hardware has been configured. (Column 12, lines 1-45, Column 17, lines 15-25; Column 7, lines 55-Column 8, lines 20: It is inherent that the guest and its associated resource could not exist without having been configured first.)

12. As per claim 7, Bean teaches wherein the virtual machine monitor uses memory management to partition I/O devices. (Column 7, lines 55-Column 8, lines 20)

13. As per claim 8, Bean teaches wherein the VMM configures the hardware to trap to the VMM either when an access misses in a translation lookaside buffer, or when one of the operating system instances modifies its page table. (Column 28, lines 30-50, Column 30, lines 15-25)

14. As per claim 9, Bean teaches wherein the hardware is configured to treat physical addresses as virtual addresses, whereby the virtual machine monitor also uses memory management to trap accesses to physical addresses. (Column 28, lines 30-50)

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15. As per claim 10, 22, 32, 40, Bean teaches wherein the hardware includes a CPU, and wherein the virtual machine monitor configures the CPU to disable direct accessibility of the physical memory, whereby the VMM can trap I/O and physical memory accesses. (Column 8, lines 59-68, Column 17, lines 15-25, lines 35-42, lines 45-53, Column 28, lines 30-50)

16. As per claim 11, 23, 33, 41, Bean teaches wherein using the memory management includes inspecting an address translation on a trap and modifying, accepting, or rejecting the translation. (Column 28, lines 30-50, Column 30, lines 15-25)

17. As per claim 12, 24, 34, 42, Bean teaches wherein using the memory management includes inserting translations for I/O addresses into a translation lookaside buffer or page table. (Column 29, lines 4-25, Column 30, lines 15-40)

18. As per claim 13, 25, Bean teaches wherein the virtual machine monitor grants unfettered access by an operating system instance to the range of physical memory covered by the translation entry in its translation lookaside buffer or page table. (Column 8, lines 1-20, Column 30, lines 15-40)

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19. As per claim 14, 26, 35, 43, Bean teaches wherein the traps occur during resource discovery of a booting operating system instance; and wherein the virtual machine monitor responds to a trap by misinforming the booting OS instance about the existence of hardware not in its partition. (Column 8, lines 1-25)

20. As per claim 15, 27, 36, 44, Bean teaches wherein the virtual machine monitor modifies a hardware description table to expose and prevent discovery. (Column 7, lines 55-Column 8, lines 25, Column 28, lines 30-55, Column 30, lines 1-42)

21. As per claim 16, Bean teaches wherein the virtual machine monitor performs emulation to share hardware. (Column 8, lines 15-17)

22. As per claim 17, Bean teaches delivering interrupts to interrupt handlers maintained by the first instance when the first instance accesses the first partition; and delivering interrupts directly to interrupt handlers maintained by the second instance when the second instance accesses the second partition. (Column 12 lines 4-45)

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23. As per claim 18, Bean teaches wherein operation of the virtual machine monitor is transparent to the first and second operating system instances. (Column 1, lines 25-60, Column 7, lines 55-Column 8 line 25)

24. As per claim 19, 28, 37, 45, Bean teaches wherein the virtual machine monitor partitions I/O devices bus-wise. (Column 7, lines 55-65, Column 8, lines 34-45: Subchannels corresponds to partitioned bus.)

Response to Arguments

25. Applicant's argument filed on 8/30/2007 claims 1-45 have been fully considered but are not persuasive.

26. In the remark applicant argued in substance that:

i) The teachings of Bean fail to disclose a virtual machine monitor preventing each of the operating system instances from discovering one of the hardware partitions of another guest.

27. The Examiner respectfully disagree with the applicant

As to point i), Bean teaches a host, which is the equivalent of a virtual machine monitor, that controls all resources assignment for each and every operating system (Column 8, lines 6-13). Moreover, any operating system that attempts to

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access any partition of resources not assigned to it would cause the host to intervene, preventing it from accessing the requested resources such that to the operating system making the request, these resources will appear as if they are not part of the system (Column 15, lines 43-54). Thus, Bean does indeed teach a virtual machine monitor that prevents operating systems from discovering one another.

Conclusion

28. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MengYao Zhe whose telephone number is 571-272-

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6946. The examiner can normally be reached on Monday Through Friday, 10:00 - 8:00 EST. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached at 571-272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


MENG-AI T. AN
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